REMARKS/ARGUMENTS

Claims 11 to 16 and 18 to 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Charquet et al. (U.S. 5,674,330). Claims 11 to 16 and 18 to 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sabol et al. (EP 0 085 553). Claim 17 was rejected under 35 U.S.C. §103(a) as being unpatentable over Sabol et al. (EP 0 085 553) or Charquet et al. (U.S. 5,674,330) as applied in 103 rejection above, in view of Armand (U.S. 4,108,687). Claims 11 to 15 and 19 to 20 were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 6 to 9 of copending Application No. 10/541,262.

Claims 11, 16 and 18 have been amended. Support for claim 11 found in the specification on page 8, lines 16 to 20, for example. Support for claim 18 found in original claim 11 and in the specification page 9, paragraph 5, lines 26 to 29, for example.

Reconsideration of the application is respectfully requested.

35 U.S.C. 103(a) Rejections based on Charquet al.

Claims 11 to 16 and 18 to 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Charquet et al. (U.S. 5,674,330).

Charquet et al. discloses a process for the production of zirconium alloy sheet metal specifically intended for the manufacture of structural elements for boiling water reactors. The process includes "producing in a vacuum and ingot having a composition of the desired alloy; forging and hot rolling the ingot; quenching of the blank thus obtained after reheating in the beta range; hot rolling after heating; heat treatment in the alpha range; at least on cycle of cold rolling followed by a heat treating in the alpha range; and final cold rolling followed by subcritical annealing in the alpha range." (See Abstract).

Claim 11 has been amended to recite, "a method for producing a zirconium alloy semi-finished product containing by weight at least 97% zirconium, intended for the production of at least one elongated product, comprising:

casting the zirconium alloy to produce an ingot with a diameter between 400 mm and 700 mm and a length between 2 m and 3 m;

two-stage forging the ingot to produce the semi-finished product intended to be formed to obtain the elongated product, wherein a first forging stage of the ingot is performed at a temperature at which the zirconium alloy is in a state comprising the crystalline α and β phases of the zirconium alloy, wherein a second forging stage follows the first forging stage; and

extruding or hot rolling the forged ingot."

Charquet et. al. does not teach or disclose "production of at least one elongated product," as recited in claim 11. Charquet et al. rather deals with flat products. (See Col. 3, lines 39 to 40). Furthermore, Charquet et al. does not specifically teach forging "at a temperature at which the zirconium alloy is in a state comprising the crystalline α and β phases of the zirconium alloy," as recited in claim 11. Charquet et al. forges between the range of temperatures, 700°C to 1100°C. (Col. 4, lines 58 to 59). Within this range, zirconium alloys can be either in a purely α domain, in a purely β domain, or in an α and β domain, but does not preference the α and β domain. No second forging step is described. In fact, hot rolling is a new term and a separate claim. It is clear from the present specification and Charquet et al. that hot rolling is not forging. (See Definition of forging: to form by heating; beat into shape. *Dictionary.com Unabridged (v 1.1)*. Random House, Inc. 13 Feb. 2008. <Dictionary.com). Forging and hot rolling are not equivalent. Forging leads to a sequential deformation of the material, by crushing and the porosities which possibly exist in the ingot tend to get closed during forging. Hot rolling on the other hand leads to a continuous deformation of the material by traction and the porosities tend to get opened during hot rolling contrary to forging.

Withdrawal of the rejections to claims 11 and the dependent claims 12 to 16 and 18 to 20 under 35 U.S.C. § 103(a) as being unpatentable over Charquet et al. thus is respectfully requested.

With further respect to claim 12, claim 12 recites "wherein at the temperature of the first forging stage, the ingot contains a volume proportion of zirconium alloy in the α phase between 10% and 90%, a remainder of the zirconium alloy of the ingot being in the β phase."

Charquet et al. fails to teach or show the specific limitations of claim 12.

Withdrawal of the rejection of this claim for this reason as well is respectfully requested.

With further respect to claim 13, claim 13 recites "wherein the first forging stage is performed at a temperature between 850°C and 950°C."

Charquet et al. fails to teach or show the specific temperature range of "850°C and 950°C," as recited in claim 13. Charquet et al. only teaches the broad temperature range of 700°C and 1100°C. It would not have been obvious to one of skill in the art to use such a specific temperature range, nor is there any motivation to do so.

Withdrawal of the rejection of this claim for this reason as well is respectfully requested.

With further respect to claim 14, claim 14 recites "wherein the first forging stage is performed at a temperature of approximately 900°C."

Charquet et al. fails to teach or show the specific temperature of "approximately 900°C," as recited in claim 14. Charquet et al. only teaches the broad temperature range of 700°C and 1100°C. It would not have been obvious to one of skill in the art to use such a specific temperature, nor is there any motivation to do so.

Withdrawal of the rejection of this claim for this reason as well is respectfully requested.

35 U.S.C. 103(a) Rejections based on Sabol et al.

Claims 11 to 16 and 18 to 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sabol et al. (EP 0 085 553).

Sabol et al. discloses "zirconium alloy intermediate and final products, and processes for their fabrication." (Page 1, lines 1 to 3).

Claim 11 has been amended to recite "a method for producing a zirconium alloy semi-finished product containing by weight at least 97% zirconium, intended for the production of at least one elongated product, comprising:

casting the zirconium alloy to produce an ingot with a diameter between 400 mm and 700 mm and a length between 2 m and 3 m;

two-stage forging the ingot to produce the semi-finished product intended to be formed to obtain the elongated product, wherein a first forging stage of the ingot is performed at a temperature at which the zirconium alloy is in a state comprising the crystalline α and β phases of the zirconium alloy, wherein a second forging stage follows the first forging stage; and

extruding or hot rolling the forged ingot."

Sabol et al. does not teach or disclose "wherein a second forging stage follows the first forging stage; and extruding or hot rolling the forged ingot." as recited in claim 11. Sabol et al. teaches thermal treating in the β phase between forging. (See Sabol et al. page 2, lines 4 to 19).

Withdrawal of the rejections to claim 11 and the dependent claims 12 to 16 and 18 to 20 under 35 U.S.C. § 103(a) as being unpatentable over Sabol et al. thus is respectfully requested.

35 U.S.C. 103(a) Rejections in view of Armand et al.

Claim 17 was rejected under 35 U.S.C. §103(a) as being unpatentable over Sabol et al. (EP 0 085 553) or Charquet et al. (U.S. 5,674,330) as applied in 103 rejection above, in view of Armand (U.S. 4,108,687).

Sabol et al. is discussed above.

Charquet et al. is discussed above.

Armand et al. discloses a method for treating zirconium and zirconium alloys. "The method consists in dissolving or maintaining a solid solution of the majority of carbon contained in these alloys by thermal or thermo-mechanical treatments carried out in the α + β range or if necessary in the β range followed by a rolling in a phase if necessary." (See Abstract).

Claim 11 has been amended to recite "a method for producing a zirconium alloy semi-finished product containing by weight at least 97% zirconium, intended for the production of at least one elongated product, comprising:

casting the zirconium alloy to produce an ingot with a diameter between 400 mm and 700 mm and a length between 2 m and 3 m;

two-stage forging the ingot to produce the semi-finished product intended to be formed to obtain the elongated product, wherein a first forging stage of the ingot is performed at a temperature at which the zirconium alloy is in a state comprising the crystalline α and β phases of the zirconium alloy,

the zirconium alloy, wherein a second forging stage follows the first forging stage; and

extruding or hot rolling the forged ingot."

In light of the discussion above, the rejection to dependent claim 17 under U.S.C. §103 is respectfully requested.

Furthermore, Armand et al. fails to teach or show "two-stage forging the ingot to produce the semi-finished product intended to be formed to obtain the elongated product, wherein a first forging stage of the ingot is performed at a temperature at which the zirconium alloy is in a state comprising the crystalline α and β phases of the zirconium alloy, wherein a second forging stage follows the first forging stage," as recited in claim 11. The Office Action cites two forging operations, however Armand et al. Col. 4, lines 35 to 41 teaches a "forging" process and a "rolling" process. The second treatment is not a forging but rather a succession of hot-rolling steps. Forging and hot rolling are not equivalent. Forging leads to a sequential deformation of the material, by crushing and the porosities which possibly exist in the ingot tend to get closed during forging. Hot rolling on the other hand leads to a continuous deformation of the material by traction and the porosities tend to get opened during hot rolling contrary to forging. Armand et al. also uses ingots that are much smaller then the present invention. (See Armand et al. Col. 4 lines 31 to 34).

It would not have been obvious for one of skill in the art to combine Sabol et al. and Armand et al. nor Charquet et al. and Armand et al. Furthermore there is no motivation to combine these references.

Withdrawal of the rejection to dependent claim 17 under U.S.C. §103 is respectfully requested.

Double Patenting

Claims 11 to 15 and 19 to 20 were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 6 to 9 of co-pending Application No. 10/541,262.

Claims 6 to 9 of co-pending Application No. 10.541,262 do not disclose a two-stage forging operation. It would not have been obvious to one of skill in the art such references. Furthermore, the Office Action fails to assert such two stage forging in the co-pending application.

CONCLUSION

The present application is respectfully submitted as being in condition for allowance and applicants respectfully request such action.

Respectfully submitted,

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